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TABLE III.

Azimuth Stars.

Star.	Above Pole. P.E.	P.E. × sin N.P.D.	No. of Obs.	Below Pole. P.E.	P.E. × sin N.P.D.	No. of Obs.
	s	s			s	
λ Ursæ Minoris	±1·643	±0·030	89	±1·449	±0·027	54
Polaris (1880–1882)	0·881	·020	135	0·985	·023	135
Polaris (1885–1887)	·824	·019	132	·827	·019	132
Cephei 51	·713	·035	59	·636	·031	102
δ Ursæ Minoris	±0·482	±0·028	111	±0·537	±0·032	52

The probable errors given above have been computed by taking the difference between each separate result for right ascension and the mean result for the year, as given in the "Ledger" section in the volumes of *Greenwich Observations*. From the squares of these differences the probable errors have been found by the usual formula.

Blackheath: April 1889.

On the Proper Motion of 85 *Pegasi.* By J. E. Gore.

Using Mr. Burnham's measures of the 9th magnitude comparison to this rapid binary star, in the years 1878–88, I have computed the following formulæ:

$$\rho^2 = 194{\cdot}0449 + 1{\cdot}491\,(t - 1874{\cdot}92)^2,$$

$$\sec(51^\circ{\cdot}25 - \theta) = 0{\cdot}0718\rho.$$

The following is a comparison between the measures and the positions computed from the above formulæ:—

Epoch.	Observer.	θ_0	θ_c	$\theta_0 - \theta_c$	ρ_0	ρ_c	$\rho_0 - \rho_c$
		°	°	°	′	″	″
1870·00	Brünnow	77·0	74·77	+2·23	16·0	15·17	+0·83
1878·54	Burnham	33·6	33·67	−0·07	14·40	14·61	−0·21
1879·27	„	30·4	30·42	−0·02	14·96	14·91	+0·05
1880·57	„	25·0	24·91	+0·09	15·41	15·54	−0·13
1881·54	„	20·8	21·13	−0·33	16·29	16·10	+0·19
1882·77	„	17·1	16·70	+0·40	17·34	16·91	+0·43
1883·537	Seagrave	11·27	14·37	−3·10	17·34	17·45	−0·11
1888·69	Burnham	0·9	0·90	0·0	21·71	21·83	−0·12

The annual proper motion of the binary pair is therefore 1″·221 in the direction of position-angle 141°·25.

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On an Error in Brünnow's Formulæ for Differential Refraction in Distance and Position-Angle. By W. H. Finlay, M.A.

My attention was recently drawn to the fact that the formulæ given by Brünnow and by Chauvenet for the differential effects of refraction on distance and position-angle do not agree, and on investigation I found that there is an error in Brünnow's formulæ.

After finding expressions for the differential refractions in right ascension and declination, he proceeds to deduce those in distance (Δ) and position-angle (π) by help of the formulæ

$$\left.\begin{aligned}\cos\delta(\alpha-\alpha') &= \Delta\sin\pi\\ \delta-\delta' &= \Delta\cos\pi\end{aligned}\right\}$$

but in differentiating the first equation he treats δ as a constant.

If these equations be differentiated, treating δ as a variable and substituting $\kappa\tan\zeta\cos\eta$ for $d\delta$, it will be found that the expressions for refraction in distance and position-angle agree exactly with Chauvenet's formulæ.

Royal Observatory, Cape of Good Hope:
1889, *March.*

Photographs of the Nebulæ M 81, 82, *and a Nebulous Star in Ursa Major.* By Isaac Roberts.

The photographs were taken on March 31, 1889, with an exposure of $3\frac{1}{2}$ hours. One is enlarged five times and the other fifteen times the negative, and they show that the nebula M 81 is of a spiral character, and so differs from the other nebulæ, which have been already photographed, and differs also from the written descriptions of it which have been published by Sir John Herschel and by the Earl of Rosse. Sir J. Herschel refers to it as a "remarkable object, extremely bright, extremely large, suddenly very much brighter in the middle, and with a bright nucleus." The Earl of Rosse confirms these statements, and adds that it extends about 8′ from the nucleus to the north and does not extend beyond the first two stars.

The photograph shows it to extend far beyond the two stars presumably referred to, and the negative shows that the nucleus, which has not a well-defined boundary, is surrounded by rings of nebulous or meteoric matter, and that the outermost rings are discontinuous in the n.p. and s.f. directions.

It is very noticeable that there are numerous stars, or, more probably, star-like condensations of the nebular matter, arranged symmetrically, and apparently incorporated with the rings. It

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